CLAIMS

1. Method of producing a bioactive composite material, comprising apatite, for dental or orthopaedic use, which material comprises groups with a tendency for decomposition (e.g. vaporisation), where a densification of the material is performed at high temperatures under pressure, c h a r a c t e r i s e d i n that the densification is performed in a closed system where applying of pressure partially or completely takes place before an end temperature for the densification is reached, and before commencing substantial decomposition of apatite phase.

2. Method according to claim 1, c h a r a c t e r i s e d i n that said groups with a tendency for decomposition are hydroxyl, carbonate, phosphate, halogen or a combination thereof.

3. Method according to any of the preceding claims, c h a r a c t e r i s e d i n that one phase in the material comprises a construction ceramic, preferably an oxide, most preferably aluminium oxide, zirconium oxide or titanium oxide, in a concentration of 10-95 vol-%, preferably 40-95 vol-% and even more preferred 55-85 vol-%.

4. Method according to any of claims 1-2, c h a r a c t e r i s e d i n that one phase in the material comprises a construction metal, preferably Fe or Co-Cr based or Ti, Ta or Zr based, in a concentration of 10-95 vol-%, preferably 40-95 vol-% and even more preferred 55-85 vol-%.

5. Method according to any of the preceding claims, c h a r a c t e r i s e d i n that said composite material comprises hydroxyapatite and/or other apatite in a concentration of 5-80 vol-%, preferably 10-50 vol-% and even more preferred 25-45 vol-%.

6. Method according to any of claims 1-5, c h a r a c t e r i s e d i n that said closing of the system and applying of pressure takes place at temperatures below 900 °C, for ceramic based composites preferably below 800 °C, even more preferred below 700 °C, and for metal based composites preferably below 500 °C.

7. Method according to any of the preceding claims, c h a r a c t e r i s e d i n that said densification of the material is driven to an end temperature above 900 °C, preferably above 1000 °C and even more preferred above 1100 °C, for ceramic based composites, or 500-800 °C, preferably 600-800 °C for metal based composites, and an

end pressure above 100 MPa, preferably up to 200 MPa.

8. Method according to any of the preceding claims, characterised in that said applying of pressure is performed as a partial applying of pressure, before an end temperature for the densification is reached, and before commencing decomposition of apatite phase, whereby a part pressure of 0.2-10 MPa is applied.

9. Method according to any of the preceding claims, characterised in that said densification of the material is performed stepwise, whereby a first part pressure is applied, preferably of about 0.2-5 MPa, and is maintained up to a first temperature, whereafter a second part pressure is applied, preferably of about 1-10 MPa, and is maintained up to a second temperature, whereafter a possible further is applied, or an end pressure and an end temperature is applied.

10. Method according to any of the preceding claims, characterised in that one or more helping agents are added to a barrier layer at densification by hot isostatic pressing or to a powder bed at densification by over pressure sintering, in order to further suppress unwanted reactions, like decomposition and oxidation.

11. Method according to claim 10, characterised in that said helping agent is a fine-grained metal powder and/or an easily decomposing hydrate.

12. Bioactive composite material, comprising apatite, for dental or orthopaedic use, which comprises groups with a tendency for decomposition (e.g. vaporisation), characterised in that it has been produced by to a method according to any of the above claims.